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Research report

Risk and protective factors associated with suicidal ideation in veterans of Operations Enduring Freedom and Iraqi Freedom

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ABSTRACT

Background: Little is known about variables associated with suicidality in veterans of Operations Enduring Freedom and Iraqi Freedom (OEF/OIF).

Methods: A total of 272 OEF/OIF veterans completed a survey containing measures of psychopathology, resilience, and social support. Thirty-four respondents (12.5%) reported contemplating suicide in the two weeks prior to completing the survey.

Results: Suicide contemplators were more likely to screen positive for posttraumatic stress disorder (PTSD), depression, and an alcohol problem, and scored higher on measures of psychosocial difficulties, stigma, and barriers to care, and lower on measures of resilience and social support. Logistic regression analysis revealed that positive PTSD and depression screens, and increased psychosocial difficulties were associated with suicidal ideation, and that increased postdeployment social support and sense of purpose and control were negatively associated with suicidal ideation.

Conclusions: Interventions for PTSD, depression, and psychosocial difficulties, and to bolster postdeployment social support and resilience may be helpful in preventing suicidal ideation in OEF/OIF veterans.

1. Introduction

A significant percentage of veterans of Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) are returning from their deployments with posttraumatic stress disorder (PTSD), depression, and related psychological problems that increase risk of suicide (Tanielian and Jaycox, 2008). The prevalence and correlates of these conditions in this population have been characterized in previous research (Hoge et al., 2004; Tanielian and Jaycox, 2008). However, the extent to which specific risk factors (e.g., PTSD) may increase risk for suicidal ideation, or whether protective factors such as social support and resilience may buffer the negative effects of these conditions on suicidal ideation, has yet to be examined.

Research on suicidality has revealed that increased combat exposure (Boehmer et al., 2004; Thoresen and Mehlum, 2008), active duty versus Reserve/National Guard service (Kang and Bullman, 2008), depression, PTSD, and substance use problems (Harris and Barraclough, 1997; Kang and Bullman, 2008; Kessler et al., 1999; Mills et al., 2006a,b; Tanielian and Jaycox, 2008; Wilcox et al., 2004), psychosocial difficulties (Kirkcaldy et al., 2006), and stigma (Sudak et al., 2008) are associated with increased suicidal ideation and/or attempts. Greater psychological resilience (Roy et al., 2007) and social support (Greening

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and Stoppelbein, 2002; Kotler et al., 2001) may protect against the development of traumatic stress and depressive symptoms, and may serve as psychosocial buffers of suicidality. An examination of risk and protective variables associated with suicide in OEF/OIF veterans is critical given recent reports concerning an increased risk of suicide among veterans with mental disorders (Kang and Bullman, 2008).

The purpose of this study was to: (1) provide a descriptive analysis of demographic, risk and protective correlates of suicidal ideation in OEF/OIF veterans; and (2) to use a multivariate approach to determine which risk and protective variables are most strongly associated with suicidal ideation. We hypothesized that OEF/OIF veterans contemplating suicide would be more likely to screen positive for PTSD, depression, and alcohol problems, and that they would report greater psychosocial difficulties, stigma, and barriers to care, and lower resilience and social support. We also predicted that, in a multivariate model, PTSD and depression would be positively associated and social support and resilience would be negatively associated with suicidal ideation.

2. Method

2.1. Sample

Participants were 272 OEF/OIF veterans from Connecticut who completed the Connecticut OEF/OIF Veterans Needs Assessment Survey (dates of service: 01/03 to 03/07). This survey was developed to identify salient needs of OEF/OIF Veterans in Connecticut and provide recommendations for legislative and public policy initiatives to improve readjustment to civilian life. The target population was all Connecticut veterans who served in OIF/OEF since 2003. Potential respondents were identified by inspection of copies of discharge papers (DD-214s) that were sent to the Commissioner of Veterans' Affairs for the state. Her staff identified eligible Veterans and selected the first, 1050 (alphabetically) for the target sample. Surveys were anonymous and no identifying information was available to the authors. A total of 1050 surveys were mailed and 272 were returned (25.9% return rate); despite this relatively low return rate, demographic, deployment, and clinical characteristics were comparable to a nationally representative sample of OEF/OIF veterans (Tanielian and Jaycox, 2008), though respondents to the current survey were older and consisted of more white reserve/National Guard veterans. On average, surveys were completed 26.9 ± 0.7 months following return from their last deployment. Institutional review boards of Yale University, Central Connecticut State University, and the VA Connecticut Healthcare System approved the study.

2.2. Assessments

2.2.1. Risk variables

The *Combat Experiences Scale* (CES) is a 15-item self-report instrument from the Deployment Risk and Resilience Inventory (DRRI; King et al., 2006; Vogt et al., 2008) that assesses exposure to combat, such as firing a weapon, being fired on by enemy or friendly fire, witnessing injury and death. Higher scores indicate greater combat exposure. Cronbach's α on CES items was 0.93.

The *Patient Health Questionnaire-9* (PHQ-9; Kroenke and Spitzer, 2002) is a 9-item self-report screening instrument for depression derived from the clinician-administered Primary Care Evaluation of Mental Disorders. Higher scores indicate greater depressive symptoms, with scores ≥ 15 indicating a positive screen for depression. One question asks respondents to rate frequency of suicidal ideation: "Over the last 2 weeks, how often have you been bothered by any of the following problems? — Thinking that you would be better off dead or that you want to hurt yourself in some way." Responses are "Not at all;" "Several days;" "More than half the days;" and "Nearly every day." Suicidal ideation was operationalized as endorsement of any of the latter three responses. Cronbach's α on PHQ-9 items was 0.92.

The *Posttraumatic Stress Disorder Checklist-Military Version* (PCL-M; Weathers et al., 1991) is a 17-item screening instrument based on diagnostic criteria for PTSD. Respondents who scored ≥ 50 and who met B, C, and D criteria for PTSD were identified as screening positive for PTSD. This definition provides a conservative estimate of the prevalence of PTSD that corresponds to DSM-IV criteria for PTSD. Cronbach's α on PCL-M items was 0.96.

The *CAGE Questionnaire* (Ewing, 1984) is a 4-item instrument used to identify individuals with a possible alcohol problem. Despite its brevity, it has been shown to have good validity in screening large populations. A score ≥ 2 is indicative of a possible alcohol problem. Cronbach's α on CAGE items was 0.72.

The *Psychosocial Difficulties Scale* (PDS) is a 23-item questionnaire developed by two of the authors (M. B. G., J. C. M.) that assesses psychosocial functioning in family and peer relationships (e.g., "have difficulty connecting emotionally with family and/or friends"), and work, school, and financial functioning (e.g., "have difficulty finding employment;" "have difficulty paying bills." Ratings are "Not a concern," "A slight concern," "A moderate concern," and "A major concern." Higher scores indicate greater psychosocial difficulties. Cronbach's α on PDS items was 0.89.

Perceived Stigma and Barriers to Care for Psychological Problems (Hoge et al., 2004; Britt et al., 2008). This instrument assesses stigma (6 items; sample question: "My leaders would blame me for the problem.") and obstacles that prevent or dissuade individuals from seeking mental health treatment (5 items; sample question: "It is difficult to schedule an appointment"). Responses range from "strongly agree" to "strongly disagree," with mean ratings for each summary scale serving as outcome measures. Cronbach's α for the stigma and barriers to care scales were 0.91 and 0.74, respectively.

2.3. Protective variables

The *Connor-Davidson Resilience Scale* (CD-RISC; Connor and Davidson, 2003) is a 25-item self-report assessment of psychological resilience. Total scores range from 0–100, with higher scores reflecting greater resilience. Cronbach's α on CD-RISC items was 0.94.

The *Unit Support Scale* (USS) is a 12-item self-report instrument from the DRRI (King et al., 2006; Vogt et al., 2008) that assesses the amount of assistance and encouragement in the war zone from unit leaders and members, and the military in general. Cronbach's α on USS items was 0.93.

The *Postdeployment Social Support Scale* (PSSS) is a 15-item self-report measure from the DRRI (King et al., 2006; Vogt et al., 2008) that assesses postdeployment emotional support and instrumental assistance provided by family, friends, coworkers, employers, and community. Cronbach's α on PSSS items was 0.82.

2.4. Data analysis

Logarithmic base 10 transformations were used to transform non-normally distributed continuous variables (e.g., PCL-M scores) prior to analysis. Demographic characteristics between respondents with and without suicidal ideation and scores on measures with interval data were compared using χ^2 tests and univariate analyses of variance (ANOVAS; two-tailed, $\alpha = 0.05$). Cohen's d values ($[\text{Mean}_{\text{group1}} - \text{Mean}_{\text{group2}}]$/pooled standard deviation) were computed to estimate effect sizes of group differences (Cohen, 1988). To examine specific dimensions of resilience and social support associated with suicidal ideation, exploratory factor analyses with varimax rotation were used to examine the factor structure of the CD-RISC, USS, and PSSS; unique factors were identified as those with eigenvalues >1.00. Logistic regression analyses were conducted to examine associations between suicidal ideation and risk and protective factors. Step 1 included risk factors (e.g., combat exposure, PTSD, depression, alcohol use problem, psychosocial difficulties, stigma, barriers to care), and Step 2 included protective factors (e.g., resilience and social support subscales identified in exploratory factor analyses).

3. Results

3.1. Suicidal ideation

A total of 34 (12.5%) respondents endorsed suicidal ideation on the PHQ-9: 22 (8.2%) endorsed "Several days;"

Table 1
Demographic, risk, and protective variables by suicidal ideation status.

	No suicidal ideation	Suicidal ideation	F or χ^2	p	
N	233	34			
Demographic characteristics					
Age	36.7 (0.7)	34.9 (1.8)	0.94	0.33	
Sex (% male)	88.8%	91.1%	0.17	0.68	
Race/ethnicity			4.64	0.20	
White	203 (87.1%)	29 (85.3%)			
Black	12 (5.2%)	1 (2.9%)			
Hispanic	10 (4.3%)	4 (11.8%)			
Other	8 (3.4%)	0 (0%)			
Education			0.43	0.81	
High school	32 (13.8%)	6 (17.6%)			
Some college/college graduate	175 (75.4%)	24 (70.6%)			
Graduate school	25 (10.8%)	4 (11.8%)			
Married/living w/ partner	63.8%	55.9%	0.79	0.37	
Service duty			0.21	0.65	
Active duty	24.9%	29.2%			
National guard or reserves	75.1%	70.8%			
More than one deployment	32.2%	26.5%	0.45	0.50	
Risk variables					*d* or OR (95%CI) in bivariate analyses
Positive PTSD screen [a]	35 (15.0%)	24 (70.6%)	53.22	<0.001	13.58 (5.98–30.84)
Positive depression screen [a]	20 (8.6%)	22 (64.7%)	70.50	<0.001	19.52 (8.43–45.21)
Positive alcohol problem screen [a]	57 (25.2%)	15 (51.7%)	8.91	0.003	3.18 (1.44–6.98)
Combat experiences score [a]	38.3 (1.1)	46.2 (2.8)	6.84	0.009	0.50
Psychosocial difficulties score [a]	42.3 (0.8)	57.4 (2.3)	38.97	<0.001	1.12
Perceived stigma score [a]	2.5 (0.1)	2.9 (0.2)	3.98	0.047	0.40
Perceived barriers to care score [a]	2.2 (0.1)	2.6 (0.2)	4.49	0.035	0.44
Protective variables					
Resilience score [a]	75.5 (1.0)	60.9 (2.8)	24.46	<0.001	0.75
Hardiness	21.4 (0.3)	17.2 (1.3)			0.67
Purpose/control	20.9 (0.3)	15.4 (1.2)			0.91
Leadership	15.7 (0.2)	12.5 (0.9)			0.70
Effort	11.9 (0.2)	10.8 (0.7)			0.32
Spiritual	5.0 (0.1)	4.2 (0.4)			0.38
Unit support score [a]	42.0 (0.8)	36.1 (2.1)	7.29	0.007	0.47
Unit member support	18.8 (0.3)	17.8 (1.0)			0.17
Leadership support	12.1 (0.3)	9.9 (0.9)			0.42
Military support	10.9 (0.2)	8.9 (0.8)			0.52
Postdeployment social support score [a]	56.6 (0.7)	47.5 (1.8)	23.25	<0.001	0.83
Community support	20.2 (0.3)	17.5 (1.1)			0.50
Instrumental support	19.2 (0.3)	16.1 (0.8)			0.67
Accessibility of family and friends	11.4 (0.2)	9.0 (0.6)			0.72
Lack of understanding	6.4 (0.1)	7.3 (0.4)			0.39

[a] Groups differ, $p < 0.05$; d = Cohen's d estimate of effect size of group difference; OR (95%CI) = odds ratio and 95% confidence interval.

5 (1.9%) "More than half the days;" and 7 (2.6%) "Nearly every day."

3.2. Demographic characteristics

In the full sample, mean age was 34.9 ± 0.4 years, 89.4% were white, 82.4% completed at least some college education, 27.8% were active duty and 72.2% were in the National Guard or Reserves; 87.4% were in the Army, 9.1% Marines, 2.2% Air Force, and 1.3% multiple branches; 68.5% were deployed once and 31.5% were deployed two or more times.

3.3. Exploratory factor analysis of protective variables

Exploratory factor analysis of the Connor-Davidson Resilience Scale revealed five factors with eigenvalues of 11.81, 1.58, 1.29 1.07, and 1.02, respectively (total of 67.1% variance explained); results were similar with oblique rotation. The first factor, labeled "Hardiness," consisted of items related to ability to adapt to challenges (e.g., "I can deal with whatever comes my way"); the second factor, labeled "Purpose/Control," consisted of items related to a sense of personal control and purpose (e.g., "I feel in control of my life"); the third factor, labeled "Leadership," consisted of items related to control and sense of leadership (e.g., "I prefer to take the lead in solving problems, rather than letting others make all the decisions."); the fourth factor, labeled "Effort," consisted of items related to relying on providing one's best effort to persevere through stressful experiences (e.g., "I give my best effort no matter what the outcome may be"); the fifth factor, labeled "Spiritual," consisted of items related to spiritual factors (e.g., "Fate or god can help").

Exploratory factor analysis of the Unit Support Scale revealed three factors with eigenvalues of 6.88, 1.83, and 1.14, respectively (total of 82.1% variance explained); results were similar with oblique rotation. The first factor, labeled "Unit member support," consisted of items related to aspects of support provided by unit members (e.g., "My unit felt like a family"); the second factor, labeled "Leader support," consisted of items related to aspects of support provided by commanders/leaders (e.g., "My superiors treated me as a person"); the third factor, labeled "Military support," consisted of items related to aspects of general support provided by the military (e.g., "Military appreciated my service.").

Exploratory factor analysis of the Postdeployment Social Support Scale revealed four factors with eigenvalues of 5.53, 1.98, 1.30, and 1.16, respectively (total of 66.5% variance explained); results were similar with oblique rotation. The first factor, labeled "Community support," consisted of items related to aspects of community supports (e.g., "I feel proud to be in the armed services"); the second factor, labeled "Instrumental support," consisted of items related to aspects of instrumental assistance and support (e.g., "My family and/or friends would lend me money if I needed it"); the third factor, labeled "Accessibility of family and friends," consisted of items related to availability and understanding of family and friends ("I have people I can talk to about my deployment"); the fourth factor, labeled "Lack of understanding," consisted of items related to poor understanding of what the Veteran endured (e.g., "People at home do not understand what I have been through").

Demographic and risk and protective variables by suicidal ideation status are shown in Table 1. Demographic characteristics did not differ between groups. Compared to the group that did not endorse suicidal ideation, the group that endorsed suicidal ideation were more likely to screen positive for PTSD, depression, and an alcohol problem, and scored higher on measures of combat exposure (medium effect size), psychosocial difficulties (large effect size), and perceived stigma and barriers to care (small effect sizes). They also scored lower on measures of resilience (medium effect size), unit support (medium effect size), and postdeployment social support (large effect size). The most pronounced differences between groups were on measures of purpose/control ($d = 0.91$), accessibility of family and friends ($d = 0.72$), and leadership ($d = 0.70$).

Multivariate logistic regression analysis revealed that positive depression (OR = 5.97, 95%CI = 1.86–19.13) and PTSD (OR = 3.73, 95%CI = 1.32–10.56) screens, and higher psychosocial difficulties scores (OR = 1.04; 95%CI = 1.01–1.08) emerged as significant predictors of suicidal ideation. Higher scores on the accessibility of family and friends factor of the PSSS (OR = 0.87, 95%CI = 0.76–0.99) and on the purpose/control factor of the CD-RISC (OR = 0.89, 95% CI = 0.79–0.99) were negatively associated with suicidal ideation. None of the other variables were associated with suicidal ideation (all p's > 0.23).

4. Discussion

This study examined risk and protective variables associated with suicidal ideation in a sample of OEF/OIF veterans. Respondents who endorsed suicidal ideation were more likely to screen positive for PTSD, depression, and alcohol problems, scored higher on measures of combat exposure, psychosocial difficulties, stigma, and barriers to care, and scored lower on measures of resilience, unit support, and postdeployment social support. In a multivariate model, positive screens for PTSD and depression, and increased psychosocial difficulties emerged as positive predictors of suicidal ideation, with increased scores on measures of postdeployment accessibility of family and friends and sense of purpose and control emerging as protective factors.

The finding that suicidal ideation was associated with PTSD, depression, and alcohol problems, and increased psychosocial difficulties is consistent with previous research documenting an association between these variables and suicidality (Harris and Barraclough, 1997; Kang and Bullman, 2008; Kessler et al., 1999; Mills et al., 2006a,b; Kirkcaldy et al., 2006; Tanielian and Jaycox, 2008; Wilcox et al., 2004). Results of the current study extend these findings to suggest that suicidal ideation is also associated with increased combat exposure, stigma, and barriers to care, and decreased perceptions of resilience and social support.

Respondents with suicidal ideation reported increased stigma and barriers to care compared to respondents without suicidal ideation. This finding corroborates previous reports of an association between suicide and stigma (Sudak et al., 2008) and the need to address stigma associated with mental illness in suicide prevention programs (Eagles et al., 2003). Because reports of suicidal ideation in the current study reflect symptoms experienced in the two weeks prior to

completing the survey, results of the current study highlight the need for continued symptom monitoring in at-risk veterans. Longitudinal research is needed to examine associations between perceived stigma and barriers to care, and behavioral healthcare utilization in OEF/OIF veterans.

Postdeployment social support in the form of accessibility of family and friends and greater sense of purpose and control protected against suicidal ideation, even after adjusting for risk factors. This finding is consistent with previous research (Greening and Stoppelbein, 2002; Kotler et al., 2001; Roy et al., 2007) and suggests that respondents who reported that they have family and friends with whom they could discuss their deployment and who perceived a greater sense of purpose and control were less likely to report suicidal ideation, irrespective of combat exposure severity and whether they screened positive for PTSD or depression. These findings underscore the importance of assessing levels of social support in returning veterans and in providing psychoeducation for their families and friends to emphasize the importance of postdeployment support. Given that there is often significant lag time from return from deployment to the first appearance of PTSD symptoms (Milliken et al., 2007), the timing of these interventions may be critical, especially in light of recent findings suggesting that the highest risk of suicide is within two years following discharge from the military (Kapur et al., 2009). Early outreach with a continuum of community supports may help prevent psychosocial difficulties and promote readjustment to civilian life (Goldstein and Malley, 2008). In particular, family psychoeducation may help decrease feelings of stress, isolation, and confusion among family members, and increase awareness and understanding of mental illness, how it affects the individual and their family, and how to more actively participate in promoting recovery (SAMHSA, 2003). Informing families and friends about the importance of openness to discussing their loved one's experiences related to deployment (i.e., general psychotherapeutic concepts) may also be helpful in preventing suicidal ideation and decreasing distress related to PTSD, depression, and other deployment-related conditions. To enhance resilience and sense of purpose and control, interventions such as well-being therapy (Fava et al., 1998) and hardiness training (Maddi, 2007), which focus on enhancing personal growth, purpose in life, autonomy, self-control, self-acceptance, and positive relations with others, may be useful. In the military, programs that enhance practical and psychological preparation for discharge and that encourage appropriate help-seeking behavior following discharge may be helpful in mitigating suicide risk (Kapur et al., 2009). Gatekeeper training (Matthieu et al., 2008), telehealth suicide prevention (Godleski et al., 2008), increased staff and patient training in risk factors for suicide, and improved assessment and communication of patient risk may also be useful (Mills et al., 2006b). While these studies provide insight into some suicide prevention strategies, more research is needed to evaluate their effectiveness in mitigating suicidality in OEF/OIF veterans.

Methodological limitations of this study include a relatively low survey return rate; possible response bias; limited generalizability to relatively older and predominantly National Guard/Reserve sample of OEF/OIF veterans; and use of screening instruments to assess PTSD, depression, and alcohol problems. Nevertheless, demographic, deployment, and clinical characteristics of survey respondents in the current study were generally comparable to a nationally representative sample of OEF/OIF veterans (Tanielian and Jaycox, 2008). Further, history of suicidality, one of the strongest predictors of current suicidal ideation (Kirkcaldy et al., 2006), was not assessed. Also, the suicidal ideation variable used to classify groups reflects two dimensions of suicidal ideation, including passive death wishes and wish for self harm, which may be differentially related to outcomes. An additional limitation is that, due to the brevity of the survey, only a select number of assessments were included. More research is needed to determine whether other deployment-related conditions such as physical injuries, traumatic brain injury, and chronic pain may interact with PTSD, depression, and related psychiatric conditions in increasing risk of suicide (Tanielian and Jaycox, 2008; Gutierrez et al., 2008). Despite these limitations, this study provides a preliminary examination of risk and protective variables associated with suicidal ideation in OEF/OIF veterans. Future research should endeavor to replicate these findings in larger, more representative samples of OEF/OIF veterans as well as in other military and civilian populations; examine specific roles of protective variables in mediating the relationship between psychiatric conditions and suicidality; and develop and test the efficacy of suicide prevention programs in veteran populations.

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Conflict of interest

None of the authors have any conflicts of interest.

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